



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
30.09.1998 Bulletin 1998/40

(51) Int Cl.⁶: **H01L 29/78, H01L 29/423,
H01L 21/336, H01L 29/739,
H01L 29/74**

(43) Date of publication A2:
15.10.1997 Bulletin 1997/42

(21) Application number: **97400624.9**

(22) Date of filing: **20.03.1997**

(84) Designated Contracting States:
DE FR GB IT

(72) Inventor: **Beasom, James D.**
Melbourne, Florida 32904 (US)

(30) Priority: **10.04.1996 US 636904**

(74) Representative: **Kopacz, William James**
83, Avenue Foch
75116 Paris (FR)

(71) Applicant: **HARRIS CORPORATION**
Melbourne, FL 32919 (US)

(54) **Improved trench MOS gate device and method of producing the same**

(57) A trench MOS gate device that comprises a trench whose floor and sidewalls include layers of dielectric material, having a controlled thickness dimension. These thickness dimensions are related by a controlled floor:sidewall layer thickness ratio, which is established by individually controlling the thickness of each of the floor and sidewall dielectric layers. This floor to sidewall layer thickness ratio is at least 1 to 1, and preferably at least 1.2 to 1. A process for forming a

trench MOS gate device comprises etching a trench in a silicon device wafer and forming layers of dielectric material on the trench floor and on the sidewalls, each layer having a controlled thickness dimension, related by a controlled floor to sidewall layer thickness ratio that is preferably at least 1 to 1. When silicon dioxide is employed as the dielectric material, the layers preferably comprise a composite of thermally grown and deposited silicon dioxide.

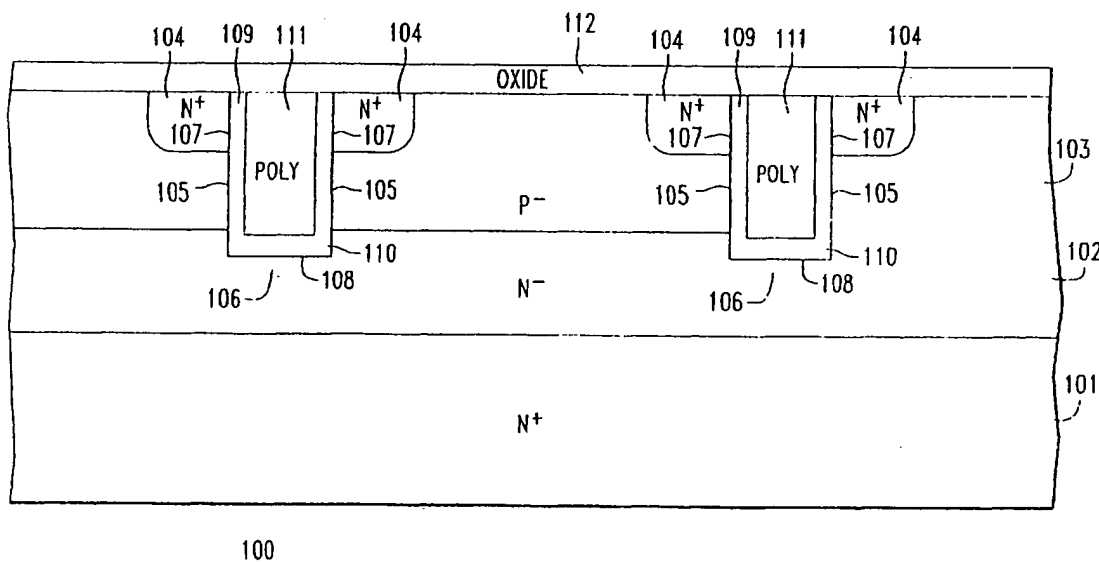


FIG. 1



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 40 0624

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 4 967 245 A (COGAN ADRIAN I ET AL) 30 October 1990 * column 3 *	1-7,10,11	H01L29/78 H01L29/423 H01L21/336 H01L29/739 H01L29/74
X	US 4 992 390 A (CHANG HSUEH-RONG) 12 February 1991 * the whole document *	1-7,10,11 8-13	
Y	US 5 016 068 A (MORI KIYOSHI) 14 May 1991 * column 6, line 26 - line 30 *	8-13	
X	US 5 424 231 A (YANG SHENG-HSING) 13 June 1995 * abstract; figures *	1-7,10,11	
X	PATENT ABSTRACTS OF JAPAN vol. 013, no. 483 (E-839), 2 November 1989 -& JP 01 192174 A (HITACHI LTD), 2 August 1989 * abstract *	1-7,10,11	
X	PATENT ABSTRACTS OF JAPAN vol. 018, no. 161 (E-1526), 17 March 1994 & JP 05 335582 A (OMRON CORP), 17 December 1993 * abstract *	1,2,6,7	TECHNICAL FIELDS SEARCHED (Int.Cl.6) H01L
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 5 August 1998	Examiner Mimoun, B
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date O : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EP/01/001 1502 03 82 (P04C01)